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[Title of the Invention] STORAGE MEDIUM WITH DATA TO BE DISPLAYED  
AND DISPLAYING DEVICE

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[Inventor]

[Domicile] c/o SHARP KABUSHIKI KAISHA  
22-22, Nagaike-cho, Abeno-ku, Osaka-shi,  
Osaka

[Name] Yuji SAWADA

[Inventor]

[Domicile] c/o SHARP KABUSHIKI KAISHA  
22-22, Nagaike-cho, Abeno-ku, Osaka-shi,  
Osaka

[Name] Hisashi SAIGA

[Inventor]

[Domicile] c/o SHARP KABUSHIKI KAISHA  
22-22, Nagaike-cho, Abeno-ku, Osaka-shi,  
Osaka

[Name] Masafumi YAMANOUE

[Inventor]

[Domicile] c/o SHARP KABUSHIKI KAISHA  
22-22, Nagaike-cho, Abeno-ku, Osaka-shi,

	Osaka
[Name]	Keisuke IWASAKI
[Inventor]	
[Domicile]	c/o SHARP KABUSHIKI KAISHA 22-22, Nagaike-cho, Abeno-ku, Osaka-shi, Osaka
[Name]	Yoshihiro KITAMURA
[Applicant for Patent]	
[Identification Number]	000005049
[Zip code]	545
[Domicile]	22-22, Nagaike-cho, Abeno-ku, Osaka-shi, Osaka
[Name]	SHARP KABUSHIKI KAISHA
[Representative]	Haruo TSUJI
[Telephone Number]	06-621-1221
[Attorney]	
[Identification Number]	100096622
[Zip code]	545
[Domicile]	c/o SHARP KABUSHIKI KAISHA 22-22, Nagaike-cho, Abeno-ku, Osaka-shi, Osaka
[Patent Attorney]	
[Name]	Masaru UMEDA
[Telephone Number]	06-621-1221
[Appointment]	TEL. 043-299-8466 Intellectual Property Division-Tokyo

Office

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[Document Name] Specification

[Title of the Invention]

STORAGE MEDIUM WITH DATA TO BE DISPLAYED AND DISPLAYING DEVICE

[Claims]

[Claim 1] A data storage medium with display data recorded thereon, wherein the display data is recorded by every specified unit and provided each with information for scroll display on a display screen.

[Claim 2] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the specified unit of recorded display data is a page.

[Claim 3] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes information scrolling display data in different directions.

[Claim 4] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes information for linking with information for another scroll display.

[Claim 5] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes information on a scroll display speed.

[Claim 6] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes information for

specifying a scroll display area.

[Claim 7] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes information for specifying a scale of enlargement or reduction of a display area for scroll display.

[Claim 8] A data storage medium with display data recorded thereon as defined in claim 1, characterized in that the information for scroll display includes synchronous reproduction information for specifying a display data content to be reproduced in synchronism with scroll display.

[Claim 9] A displaying device for reproducing and displaying the storage medium with display data recorded thereon as defined any one of claims 1 to 8, which performs scroll display based on the information for scroll display.

[Claim 10] A displaying device as defined in claim 9, characterized in that it is provided with a scroll indicating means for scroll display.

[Detailed Description of the invention]

[0001]

[Technical Field to which the Invention Pertains]

The present invention relates to a storage medium with a record of the data to be displayed and a displaying device for displaying the data of the storage medium.

[0002]

[Prior Art]

On the other hands, in case of displaying oversized image data or an enlarged portion of the image data on a display screen or changing over the screen image to another hidden (not yet displayed) area, a user usually scroll the screen image in the desired direction by pressing a "direction" key or by using a mouse. This is a very troublesome operation in particular with data of "news paper" whose multi columns is difficult to find the continuation of the sentence at the end of one column and contains a considerable data amount to be scrolled. In this connection, Japanese Laid-Open Patent publication No.4-43387 discloses a displaying device capable of automatically scrolling each image (data) having a larger size than that of the screen along a route preset and stored in the form of a series of coordinates in the coordinate system on its display screen, thus eliminating the need of manual scrolling operation. According to the art disclosed in Japanese Laid-Open Patent publication No.4-43387, the scroll is realized by tracing points of the route in a given direction to subsequently bring onto the screen hidden unit areas each being a unit rectangle of a fixed size with a center at a current point of the preset route.

[0003]

[Problems to be solves by the Invention]

It is usually desired to control the display of data in a display range and at resolution in accord with its content and font size. On the contrary, the art of Japanese Laid-Open Patent

publication No.4-43387 displays areas each of a fixed size in the same scale on the display screen and, in some cases, may not indicate necessary information on the screen and may not clearly display thin characters and details of an image.

[0004]

For a novel or comic book to be read and displayed page by page on a display screen, it is desirable that the page images are subsequently scrolled since sentences and images on each page (screenful) relates to those of the next page or a hidden part of the same page. The art cannot automatically scroll the image to subsequent image to feel the continuation of the content.

[0005]

[Means for solving Problem]

The storage medium containing display data according to the present invention (claim 1) is a storage whereon data to be displayed was recoded in specified separated units and has information scrollable for each specified unit on a display screen.

[0006]

This allows the reader to set a content adapted scroll display on the display screen, achieving the effective display according to the content of setting information for the scroll display. When reading a display data in a complex format (e.g., newspaper report in columns) on a display screen of an electronic terminal, the reader can read display data by

subsequent scrolling by a given unit without doing troublesome scrolling operation.

[0007]

The storage medium containing display data according to the present invention (claim 2) is featured in that the specified unit is a page (screenful).

[0008]

This enables page by page management of information for scroll display on the display screen to subsequently display data by scroll within a page with no need for doing complex scroll operation.

[0009]

The storage medium as described in claim 1 containing display data according to the present invention (claim 3) is featured in that the scroll display information includes information for scrolling in different directions.

[0010]

This makes it possible to successively display a page with no need for doing troublesome scroll operation even if the scroll display is made changing the scrolling direction.

[0011]

The storage medium containing display data according to the present invention (claim 4) is featured in that the scroll display information includes information about linkage with different scroll display information.

[0012]



This makes it possible to scroll the image data from the current unit to another unit of display data with no need for user's instruction, thus reducing the user's labor.

[0013]

The storage medium as described in claim 1 containing display data according to the present invention (claim 5) is featured in that the scroll display information includes information about the speeds of scrolling the display image.

[0014]

This makes it possible to selectively change a scroll speed depending upon the number of characters in each line or reduce the scroll speed while reading an important data section of the image and produce a special display effect by changing the scroll display speed.

[0015]

The storage medium as described in claim 1 containing display data according to the present invention (claim 6) is featured in that the scroll display information includes information for designating a desired display area to be scrolled.

[0016]

This makes it possible to specify a necessary display area to be displayed in neighborhood of the scrolling path, thereby solving the problem of displaying necessary information outside the scrolling path.

[0017]

The storage medium as described in claim 1 containing display data according to the present invention (claim 7) is featured in that the scroll display information includes information necessary for specifying a magnification or reduction ratio of a display area to be scrolled.

[0018]

This makes it possible to change a visible size of data in the neighborhood of the scroll path in such a way that for example an area of small size characters is enlarged to a desired degree or a specific effect is given to an image by scrolling it with gradually enlarging the image data.

[0019]

The storage medium as described in claim 1 containing display data according to the present invention (claim 8) is featured in that the scroll display information includes sync reproduction information necessary for specifying an image data content to be reproduced in synchronism with the scroll display.

[0020]

This makes it possible to create an effective scroll display image with synchronously reproduction of a sound signal or the like.

[0021]

A displaying device according to the present invention (claim 9) is a player that can reproduce display data of the storage medium according to the present invention as described

in any one of claims 1 to 8 and display by scroll the reproduced image on its display screen according to the scroll display information.

[0022]

This device can therefore achieve an effective scroll display of the image data by flexibly processing the data based on parameter information added to the scrolling path when scrolling the display image according to the information for scroll display.

[0023]

The displaying device according to the present invention (claim 10) is the displaying device as described in claim 9 featured by the provision of a scroll instruction means for specifying scroll conditions.

[0024]

This device can automatically reproduce and display the scrollable display information once the scroll display was instructed by the user. This releases the user from the labor of repeating the scroll instruction operation. On the other hand, the device allows the user to selectively scroll the display image at user's own pace by using the scroll instruction means when the user selected a mode of reproducing and displaying the scrollable image only for a duration of pressing a scroll instruction button. The user may avoid misreading of displayed data due to a faster scrolling speed.

[0025]

[Modes of carrying out the Invention]

The third embodiment of the present invention will be described first on a storage medium with recorded thereon data to be displayed. This embodiment deals with electronic book data (hereinafter referred to as book data) as data to be displayed. However, the present invention is not restricted to the electronic book data and can be applied to image data stored in image filing devices, document data prepared by word processing devices and other kinds of data that can be usually displayed on a display units.

[0026]

Fig. 1 shows a general structure of a storage medium on which book data has been recorded as display data according to the present invention. As shown in Fig. 1, the book data consists of a manage information area including book information (book title, writer's name, etc.) and page information (the total number of pages), a page data area including data of each page of the book and a scroll path information area including information necessary for scroll display and additional information. The data is recorded in form of a file on the storage medium. In Fig. 1, the page data area is divided into respective pages that are stored as separated units. Scroll path information area is also divided and distributed to respective pages. Alternatively, the page data area and scroll path information area may be stored together as shown in Fig. 2. In this case, information necessary for displaying each page

data by scrolling is managed for each page.

[0027]

Fig. 3 shows an exemplary structure of the management information area of the book data. The management information area consists of an identifier indicating the management information area, data size of this area, book information area (book title, writer's name, etc.) and a page information area storing the total number of pages. Each numeral shown on the right side in a table of Fig. 3 represents the number of bytes.

[0028]

Fig. 4 shows an exemplary structure of each page data area. The page data area consists of an identifier of the page data area, data size of this area, object data area in which objects (i.e., data elements such as character data, image data, sound data, moving picture data) are described separately, the number of objects and information indicating the presence of scroll path information added thereto. As shown in Fig. 14, each page is provided with a virtual coordinate system having an origin at a left top corner point of the page. Each page is constructed of respective objects arranged thereon according to the virtual coordinates. Sound data that cannot be displayed is virtually disposed for a whole page or in a related object area.

[0029]

The object data areas may have different data structure depending on the kinds of data. Typically, each object area consists of an identifier of the data kind, data size and object

data. For example, image data shown in Fig. 5 includes an identifier of the data kind indicating the image data, data size, image size in directions X and Y, a starting point of the coordinates on the display screen image and data compression method by which the data is compressed and stored.

[0030]

Referring to Figs. 6 to 8, the scroll path information area shown in Fig. 1 is described below. In Fig. 6, there is a mimic illustration of scroll path information set on particular page data. The book data may contain a plurality of contents in a complex form as shown Fig. 6. If the book data on a particular page is larger than the display screen or it is displayed in an enlarged size, the continuation of paragraphs may be confused on the page image. Accordingly, a scrolling path is set for each of object data contents (contents 1 and 2 typically shown in Fig. 6) in a page data area. Each scrolling path consists of partial block paths represented by respective arrows in Fig. 6. For example, a newspaper page image contains plural articles each of which is provided with a scroll path that has branches (i.e., partial block paths) at places where a column changes to another or the text changes its direction.

[0031]

Fig. 7 shows a method for storing the scroll paths in the scroll path information area. As shown on the left side of Fig. 7, the scroll path information includes a scroll path information identifier, data size of the area, the number of

scroll paths and scroll path data represented by a vector column for each path. As shown on the right side of Fig. 7, each path data includes a path data identifier, data size, a path name character string, the number of partial block paths to be scrolled, partial block information for each of the partial blocks (1-n) and link information for linking with other path. The link information is used for specifying the links with other path in the current page and other pages. The link information therefore includes information indicating the presence/absence of linked paths, the number of the page containing the linked path if such exists, the link path number indicating the number of that path in that page.

[0032]

The path name character string includes a title of the text content of an area to which the scroll path is given. For example, when the page data content is an article of a newspaper and a scroll path is set for each article, a title of the article is recoded in the path name area.

[0033]

The partial block information is stored in the order of partial blocks to be scrolled. As shown in Fig. 8, information written for each partial block includes an identifier identifying the partial block, a data size, coordinates of a starting point and an end point for representing the partial block data by a vector, scroll speeds at the starting point and the end point, scales of enlargement or reduction at the

starting point and the end point, a size of an area frame indicated at the starting point and the end point and synchronous reproduction information area storing information to be reproduced in synchronism with the beginning of scrolling the partial block. The scroll speed area includes a record of a traveling distance measured for each scroll according to the coordinate system set for the page.

[0034]

The size on the coordinates set at the page is specified by the size of an area frame indicated at the starting point and the end point. This frame size parameter is provided for the following reason. When scrolling according to a scroll path set on a page, a neighboring area along the scroll path is read from the page data, enlarged by the specified magnification factor and displayed on the displaying device. In this instance, a content necessary to be displayed may not be displayed when it is not included in the specified neighboring area. When the neighboring area is specified by the size of a frame (a) as shown in Fig. 15, the text lacing in the top and bottom characters is displayed and cannot be understood. Accordingly, it is essential to select a suitable size of a frame (e.g. a frame (b) in the shown case) in which the necessary content can be included.

[0035]

The synchronous reproduction information area stores the number of information and the specified number of information



units to be synchronously reproduced. The information includes an identifier indicating the synchronous reproduction information, a data size and an object number as shown in Fig. 8. The object number corresponds to the number of the object data stored in the form shown in Fig. 4. For example, the reproduction of sound effects in accord with the display content of the partial block can be realized by registering the sound effect data in the page data and holding the object number in the synchronous reproduction information area.

[0036]

When the display is made by using the partial block information, a rectangular area having a size (wsx, wsy) of a frame at a starting point located from the coordinates (sx, sy) of a starting point on the page data is enlarged by a enlargement ratio smag and displayed on the display means as shown in Fig. 9. The image being displayed on the screen is scrolled at a specified scroll speed sv. In this case, if the synchronous reproduction information is stored in the above area, its object specified therein is reproduced in synchronism with the scroll operation. The scroll display of the image is done from the starting point to the end point according to a center axis of the displayed rectangle, smoothly changing three values (scroll speed, magnification and frame size) to get values specified at the end point. Since the scroll speed, the frame size and the magnification factor in addition to the scroll path can be preset, the scroll display is not only

carried out in accord with the content of the display image but has a variety of scrolling, e.g., gradually enlarging the image. An increased effect may be obtained by embedding effective display data in the book data. Furthermore, it is also possible to preset suitable voice or sound data to be output during the scroll display or to set moving picture data to be reproduced in synchronism with the beginning of the scroll display. When the scroll path information is stored in the form shown in Fig. 2, it may be unclear which of pages partial block information for each path concerns. This problem can be solved by storing the number of page containing the partial block in a page number area newly provided in the partial block information of Fig. 8.

[0037]

A displaying device according to an aspect of the present invention will be described below by way of example to read the display data of the electronic book stored on the above described storage medium and display the data. However, the displaying device is not restricted to the electronic book data and can also read and display the above described display data with scroll path information added thereto.

[0038]

Fig. 10 is a block diagram of a displaying device according to the present invention. This displaying device comprises a control means (CPU) 1, a ROM 2 with control software stored therein, a RAM 3 for storing a program, an operation area and

book data (e.g., page data, book information, etc.), an input means 4 (e.g., a disc drive or a communication line) for reading the book data stored on a storage medium and a display means 5 for displaying the book data. The displaying device also includes a sound output means 6 for outputting voice and sound data included in the book data, a page turning instructing means 7 consisting of a button for inputting a user's instruction to turn a page being displayed, a display mode switching means 8 consisting of a button used by the user for switching the display mode from a usual display mode to a scroll display mode and vice versa, a scroll instructing means 9 consisting of buttons for inputting a user's instruction to scroll the display image and a CPU bus 10 for connecting all components of the displaying device. The CPU 1 receives the user's instructions input through the page turning instructing means 7, display mode switching means 8 and the scroll instructing means 9 and performs various processing operations according to the control program stored in the ROM 2. The display means 5 comprises a display control means 51 for control the display data content and a display screen 52.

[0039]

Fig. 11 is a typical external view of the displaying device according to the present invention. As shown in Fig. 11, a display screen 52 has a transparent touch sensitive film resistance tablet applied to its surface, which tablet serves as the display mode switching means 8. Speakers are the sound

outputting means 6 for outputting voice and sound data contained in the book data. Paired buttons provided on the displaying device are used common as the page turning instructing means 7 for instructing the display device to turn pages and the scroll instructing means 9. The selection of either of the buttons determines the direction of turning a page or scrolling a display image. Numeral 12 designates a slot for insertion of the storage medium on which the book data has been recorded. Numeral 13 denotes a touch pen for changing the display mode through the tablet 11 and inputting various kinds of inputs through the tablet.

[0040]

A method for processing for displaying book data on the displaying device is as follows:

The above displaying device has two display modes for reproducing page data: one is a normal display mode in which a page is displayed and subsequently updated every time when instruction for turning a page is input through the page turning instructing means 7, and the other one is a scroll display mode in which page data is displayed and scrolled changing the scale of enlargement of a part of the page data according to the scroll path information added to the book data (automatically) or a user's instruction. When the user turned on the power supply of the displaying device, the device is driven in the normal display mode. The normal display mode is changed to the scroll display mode by inputting a user's instruction to the display

mode switching means 8.

[0041]

The operation of the displaying device in the two modes is as follows: Referring to a flowchart of Fig. 12, the operation of the displaying device first in the normal display mode will be described below. A page to be displayed is set to a specified page (Step S100). A page to be displayed after turning on the power is set to a top page or a page that was opened the last reading time. A page to be displayed after switching the scroll display mode to the normal display mode is set to a current page. Page data of the set page is read and all objects in the page are output (Step S101). On completion of outputting all objects composing the page being displayed, a check is made to determine whether an instruction for turning a page has been input through the page turning instructing means 7 (Step S102). With the instruction, the current page number is changed to the next page number (Step S103) and reproduction of the page to be displayed is performed (Step S101). With no instruction for turning a page, a check is made to determine whether the user requests to change the current display mode through the display mode switching means 8. With the user's instruction, the display mode is changed to the scroll display mode. If no request was input to change the display mode, a check is made to determine whether the user requests to finish the display of page data (Step S105). If so, the procedure is finished. If no request was made to finish the display data processing,

the procedure returns to Step S102 and the above processing is repeated until the user inputs a request for any of Steps S102 to S105.

[0042]

Referring to a flowchart of Fig. 13, the operation of the displaying device in the scroll display mode will be described below. When the display mode is switched from the normal display mode to the scroll mode, scroll path information added to a page being displayed is read (Step S200) and a list of scroll path names (character strings) included in the current page (Fig. 7) is displayed on the display screen. The user is requested to select a scroll path from the presented list (Step S201). At the same time, the user is also requested to select the automatic scroll mode for automatically scroll the display image or semi automatic scroll mode for scrolling the display image only when the scroll is requested by the scroll instructing means 9. In the automatic scroll mode, the displaying device conducts scroll display automatically, subsequently reading data of the scroll path information selected by the user once the user's instruction was given through the scroll instructing means 9. In the semi automatic scroll mode, the scroll display is conducted only for a period of inputting the instruction by using the scroll instructing means 9 (for example, for a period of pressing the button). Since the selected scroll path includes plural partial blocks, a procedure (Steps S203 to S210 to be described later) is done

for each block of the path and then the procedure is transferred from Step S202 to Step S211. In Step S211, it is examined whether linking with another path is set or not. If no link is set, the display mode is changed to the normal display mode. If linking with another path is set, the page number of the path linked with the current path is examined (Step S212) and, if the page is different from the current page being displayed, page data of that page is read (Step S213). Then, the process returns to Step S202 for beginning the scroll display according to the linked scroll path information.

[0043]

The processing for each of partial blocks of the scroll path (Steps S203 to S210) is as follows: As shown in Fig. 9, a sample point is set on a line segment from a starting point to an end point. Coordinates of the starting point and the end point are included in the partial block information. The processing for scroll display is made by determining a rectangular area to be displayed on the display screen and by moving the sample point on the line segment. In Step S203, when the partial block includes synchronous reproduction information, an object included in the information is reproduced. In the shown example, the processing advances to Step S204 after the reproduction of the object in Step S203. However, the reproduction processing of the voice and sound data and the image data cannot be immediately finished. It may be conducted little by little during the loop processing (Steps S205 to S210) or parallel

with the above loop processing. After setting the coordinates (x, y) of the sample point to the starting point (sx, sy) of a partial block (Step S204), it is discriminated whether the sample point reaches to the end point (ex, ey) (Step S205). If so, the processing returns to Step S202 to process the next partial block. If the sample point did not reach the end point, the processing goes to Step S206 to calculate a rectangular area to be displayed on the display screen and the scale of its enlargement and prepare an image to be displayed. In this instance, the rectangular area size and the enlargement ratio are determined as follows: Assuming that a ratio of the distance between the current position of the sample point and the starting point to the distance between the current position of the sample point and the end point is  $s:(1-s)$  ( $0 \leq s \leq 1$ ), a size (wx, wy) of the rectangular area to be displayed on the display screen and its enlargement ratio mag are determined according to the following equations 1:

[0044]

$$Wx = (1-s) \times wsx + s \times wex$$

$$Wy = (1-s) \times wsy + s \times wey$$

$$mag = (1-s) \times smag + s \times emag$$

[0045]

where wsx, wsy is a size of the rectangle at the starting point, wex, wey is a size of the rectangle at the end point and smag and emag are enlargement ratios at the starting point and the end point respectively. A rectangular area (x-wx/2, y-



$wy/2)-(x+wx/2, y+wy/2)$  of  $wx, wy$  in size with a center placed at the current sample point is extracted as image data from the page data and enlarged by the enlargement ratio ( $mag$ ). If the enlarged image exceeds a pixel size of the display screen, the enlargement ratio is reduced not to enlarge the rectangle over the pixel size of the display screen. The thus produced image is displayed on the display screen (Step S207). It is examined whether the current mode is the automatic scroll mode (Step S208). If the current mode is the semi automatic scroll mode, the process waits until the instruction to initiate the scroll display is given through the scroll instructing means 9. When the current mode is the automatic scroll mode or the scroll instruction was given by the user, the sample point is moved (Step S210). The displacement of the sample point is determined as follows:

First, a scrolling speed  $v$  at the sample point is determined from a scrolling speed  $sv$  at the starting point and a scrolling speed  $ev$  at the end point as follows:

$$v=(1-s) \times sv+s \times ev$$

[0046]

The displacement of the sample point is then determined according to the following equations 2:

$$\Delta x = v \times \frac{ex - sx}{\sqrt{(ex - sx)^2 + (ey - sy)^2}}$$

$$\Delta y = v \times \frac{ey - sy}{\sqrt{(ex - sx)^2 + (ey - sy)^2}}$$

[0047]

The next sample point is set to  $(x+\Delta x, y+\Delta y)$ . The processing returns to Step S205 and then Steps S206 to S210 are repeated until the sample point reaches the end point. In case if the backward scroll in the semi automatic mode is allowed, coordinates  $(x-\Delta x, y-\Delta y)$  are determined as the next sample point (Step S210) and then the scroll processing is conducted. In case if the scroll path information is stored in the form shown in Fig. 2, all scroll path information is read (Step S200) and, then, the path information given to the current page being displayed is extracted from there and presented to a user who selects the path to be scrolled (Step S201). The processing steps in Steps S202 and thereafter are the same as described before.

[0048]

Automatic scroll mode relieves the user from doing troublesome settings for complex pages. Furthermore, the scroll display can be performed by changing scrolling speed, enlargement ratio and displaying area and by reproducing sound and image data in synchronism with the scrolling display. This increases the effects of display image. The scroll display can also be conducted only for time while the user instructs the scroll operation. This mode enables the user to scroll the image in accord with his or her reading speed. The scroll instructing means is composed of paired buttons to be easily operated by pressing.

[0049]

[Effect of the Invention]

According to the present invention, it is possible to add necessary scroll display information to each specified scroll display unit and set a frame size of a display area for each of partial blocks of a scroll path, a scale of enlargement and a scrolling speed. This can solve the problems that scroll display may lack in necessary information in the neighborhood of the scroll path and small characters are hard to read. A variety of the scroll display can be realized by varying the frame size, enlargement and scrolling speed. The reproduction of voice and sound data and animation data can be started in synchronism with the beginning of the scroll display. Namely, impressive representation of scroll display can be realized.

[Brief Description of the Drawings]

Figure 1 shows a whole structure of a storage medium containing book data to be displayed by an embodiment of the present invention.

Figure 2 shows a whole structure of a storage medium containing book data to be displayed by another embodiment of the present invention.

Figure 3 shows an exemplary structure of an area for managing information of book data.

Figure 4 shows an exemplary structure of an area for page data of book data.

Figure 5 shows an example of image data among objects stored

in a page data area.

Figure 6 is a mimic illustration of a scrolling path preset in a page data area.

Figure 7 shows exemplary data in a scroll path information area.

Figure 8 shows partial divisional information stored in a scroll path information area.

Figure 9 is a view for explaining a relation between values stored in partial divisional information of Fig. 9 and a method for scrolling image data.

Figure 10 is a block diagram of a display unit according to an aspect of the present invention.

Figure 11 shows an external view of a portable display unit according to the present invention.

Figure 12 is a flowchart depicting a data processing procedure for carrying out of a usual display mode of an display unit according to the present invention.

Figure 13 is a flowchart depicting the data processing procedure for carrying out of a scroll display mode of a display unit according to the present invention.

Figure 14 is a mimic illustration of a page composed of plural different objects arranged thereon.

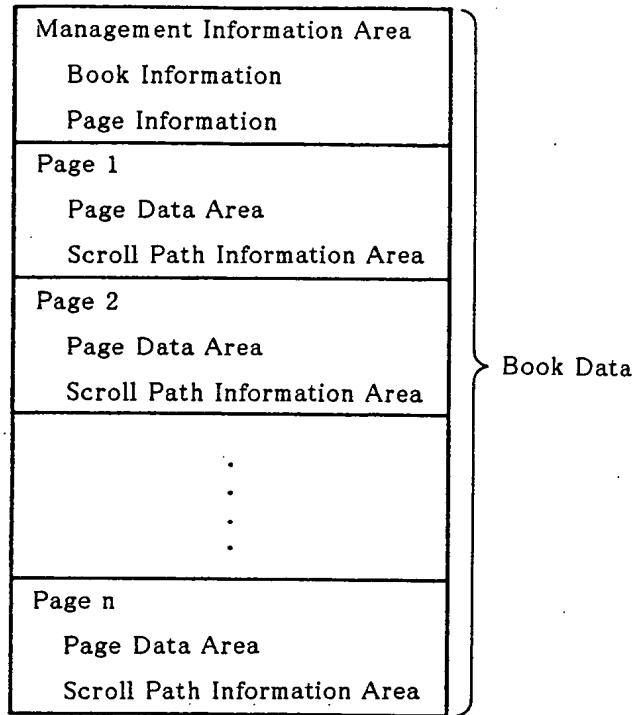
Figure 15 illustrates a display frame to be stored in a partial divisional information area.

[Explanations of Letters and Numerals]

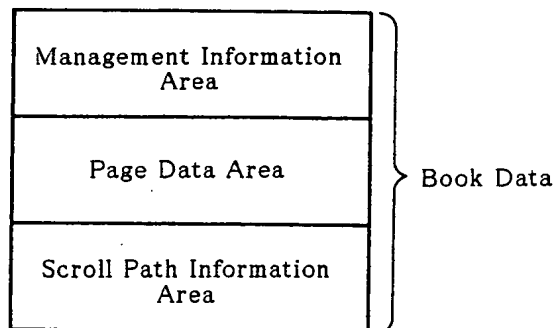
1 CPU

- 2 ROM
- 3 RAM
- 4 Input Means
- 5 Display Means
- 6 Sound Outputting Means
- 7 Page Turning Instructing Means
- 8 Display Mode Switching Means
- 9 Scroll Instructing Means
- 10 CPU Bus

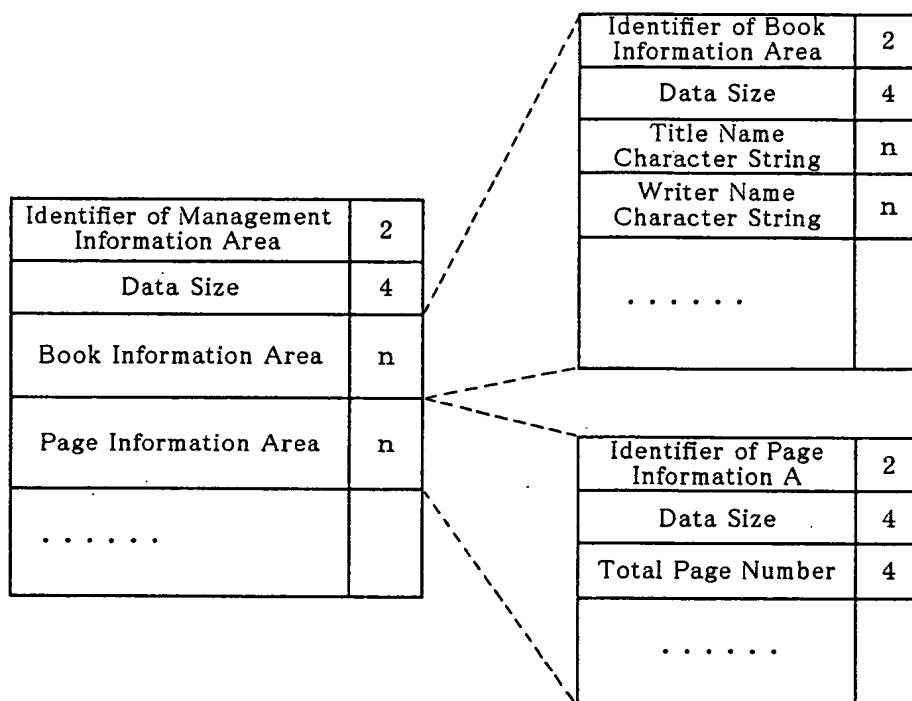
# FIG.1



# FIG.2



# FIG.3



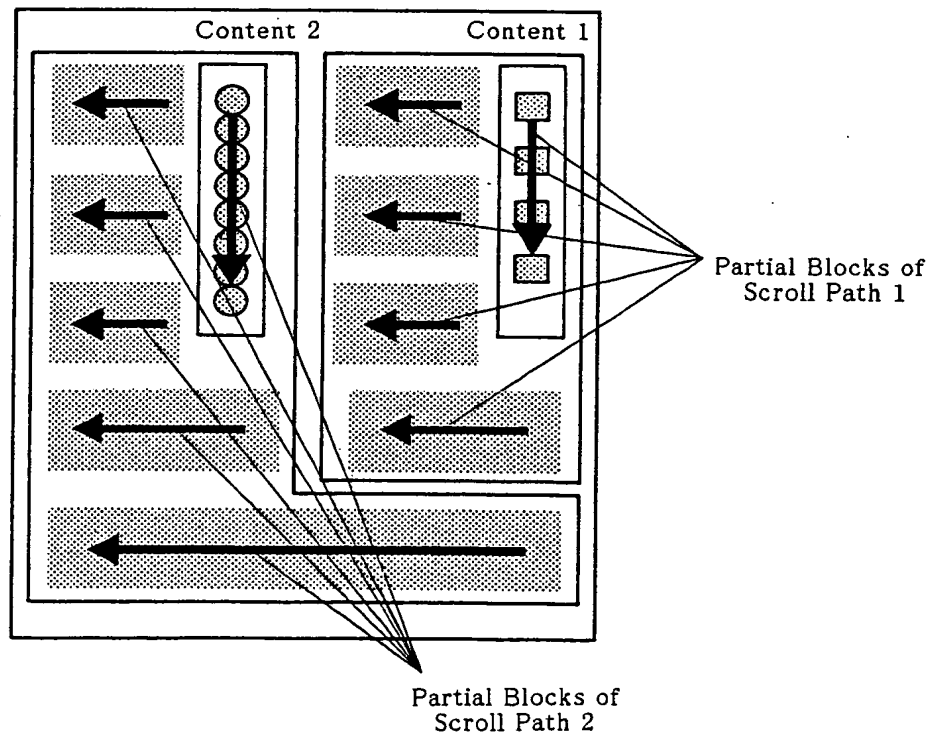
# FIG.4

Identifier of Page Information Area	2
Data Siz	4
The number of Objects	2
Data area for Object 1	
Data Type Identifier	2
Data Size	4
Object Data	n
.....	
Data area for Object 1	
Data Type Identifier	2
Data Size	4
Object Data	n
Presence/Absence of Scroll Path Information	1

# FIG.5

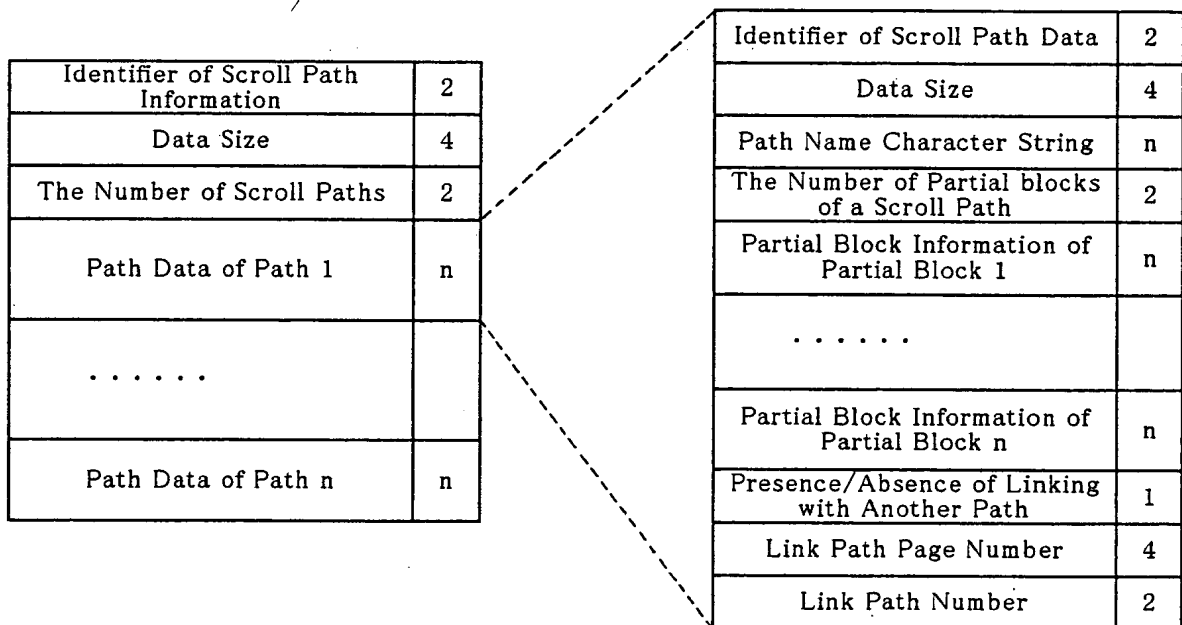
Data Type Identifier	2
Data Size	4
Image Size x	2
Image Size y	2
Starting Point x-ordinate	2
Staritng Point y-ordinate	2
Compression Method	1
Image Data	n

# FIG.6





# FIG.7



# FIG.8

Synchronous Reproduction Information Area	Identifier of Partial Block Information	2
	Data Size	4
	x-ordinate of Start Point	2
	y-ordinate of Start Point	2
	x-ordinate of End Point	2
	y-ordinate of End Point	2
	Scroll Speeds at Start Point	2
	Scroll Speeds at End Point	2
	Enlargement at Start Point	8
	Enlargement at End Point	8
	Start Point Frame Size x	2
	Start Point Frame Size y	2
	End Point Frame Size x	2
	End Point Frame Size y	2
	The Number of Information to be Synchronously reproduced	1
	Synchronously Reproducible Information 1	n
	.....	
	Synchronously Reproducible Information n	n

Identifier of Synchronously Reproducible Information	
Data Size	
Object Number	

FIG.9

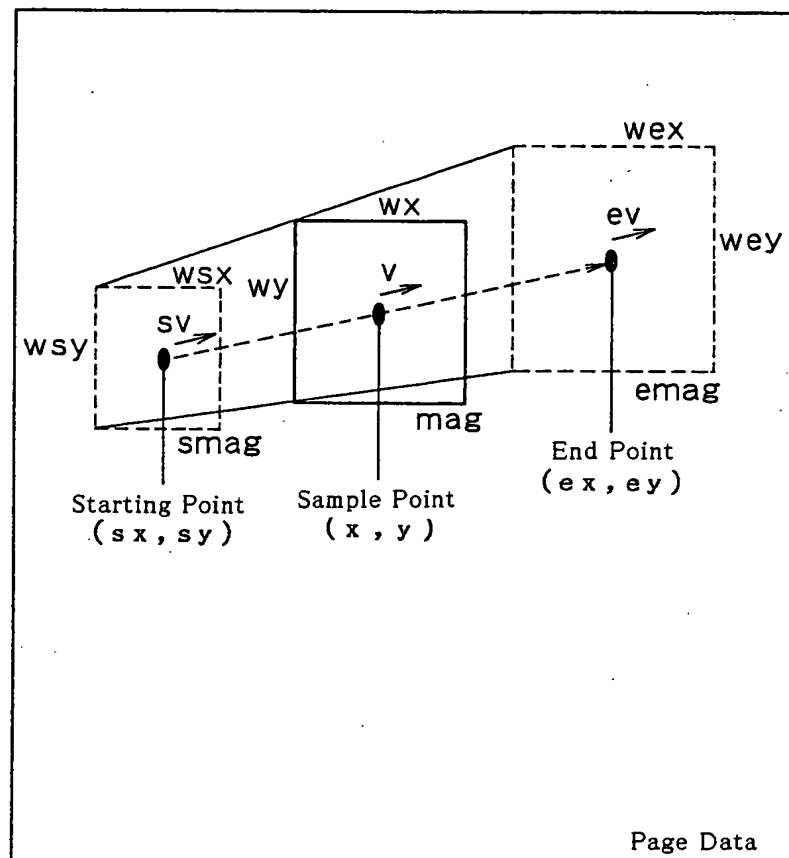


FIG.10

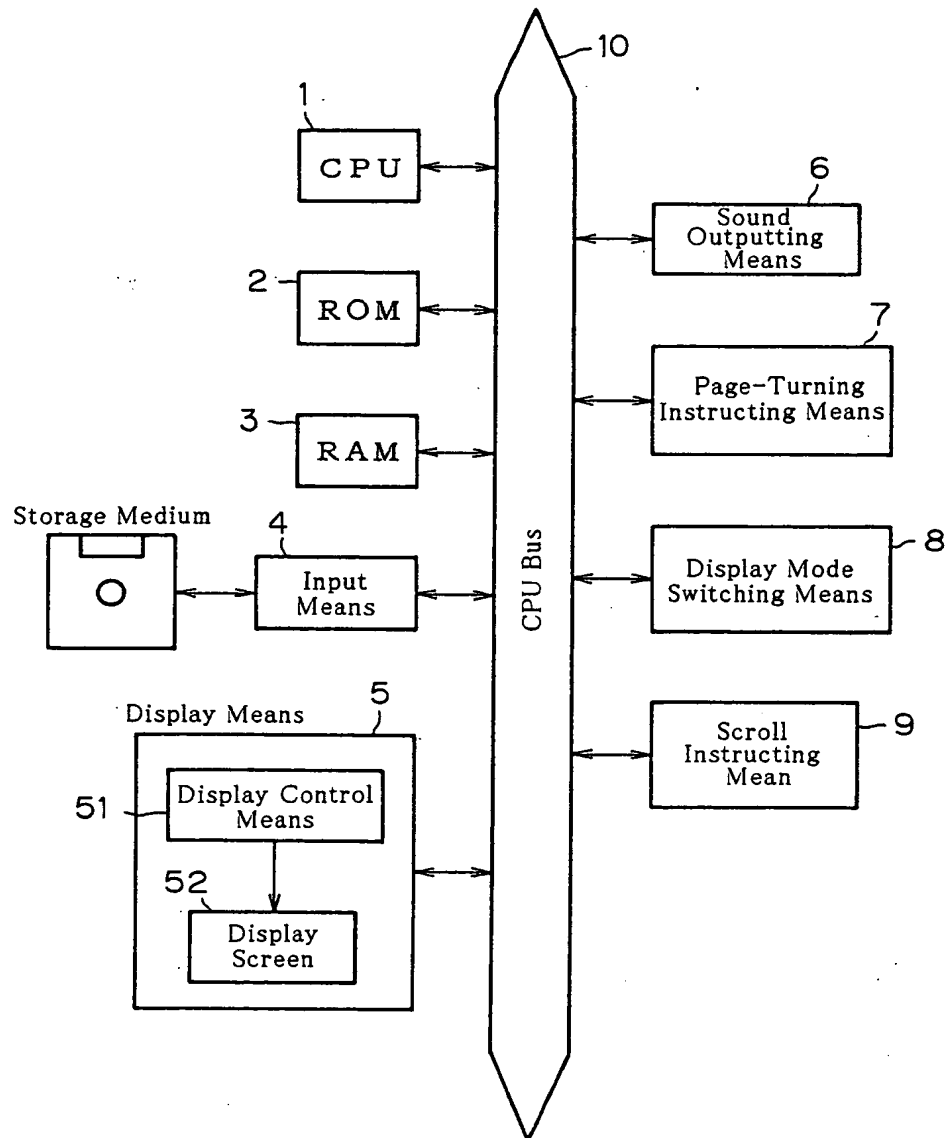


FIG.11

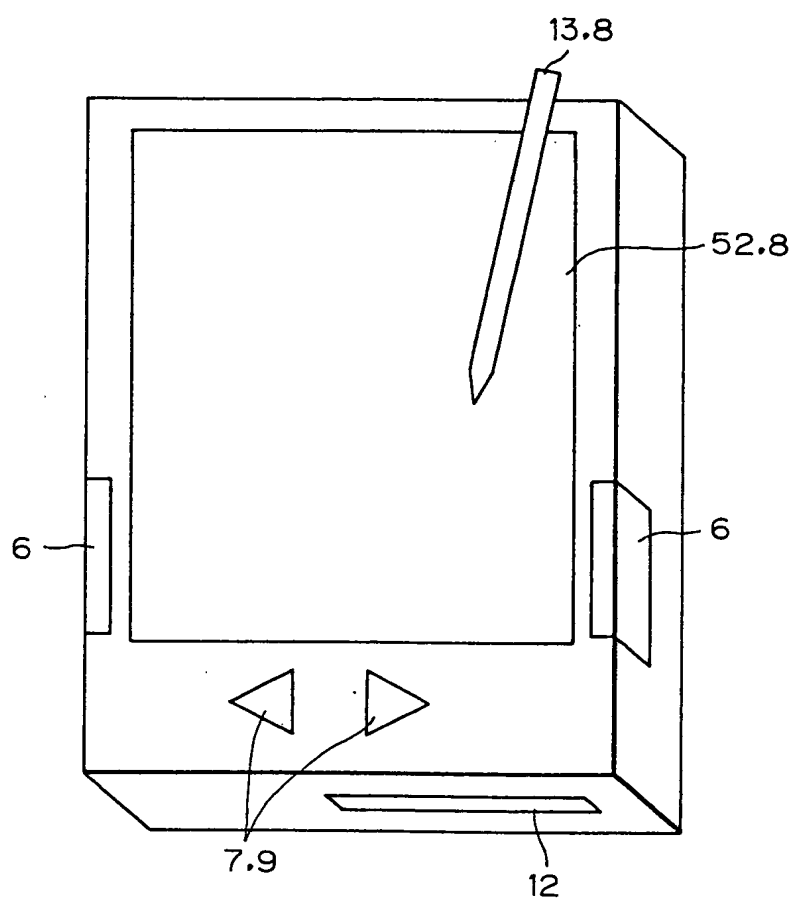
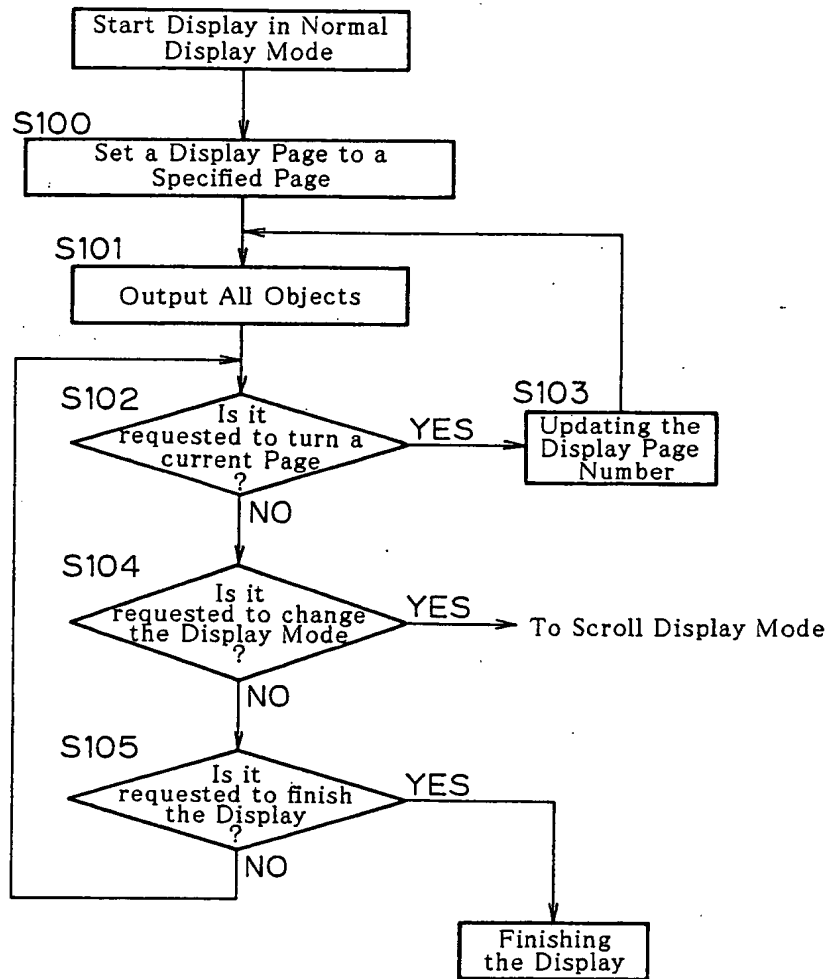


FIG.12



# FIG.13

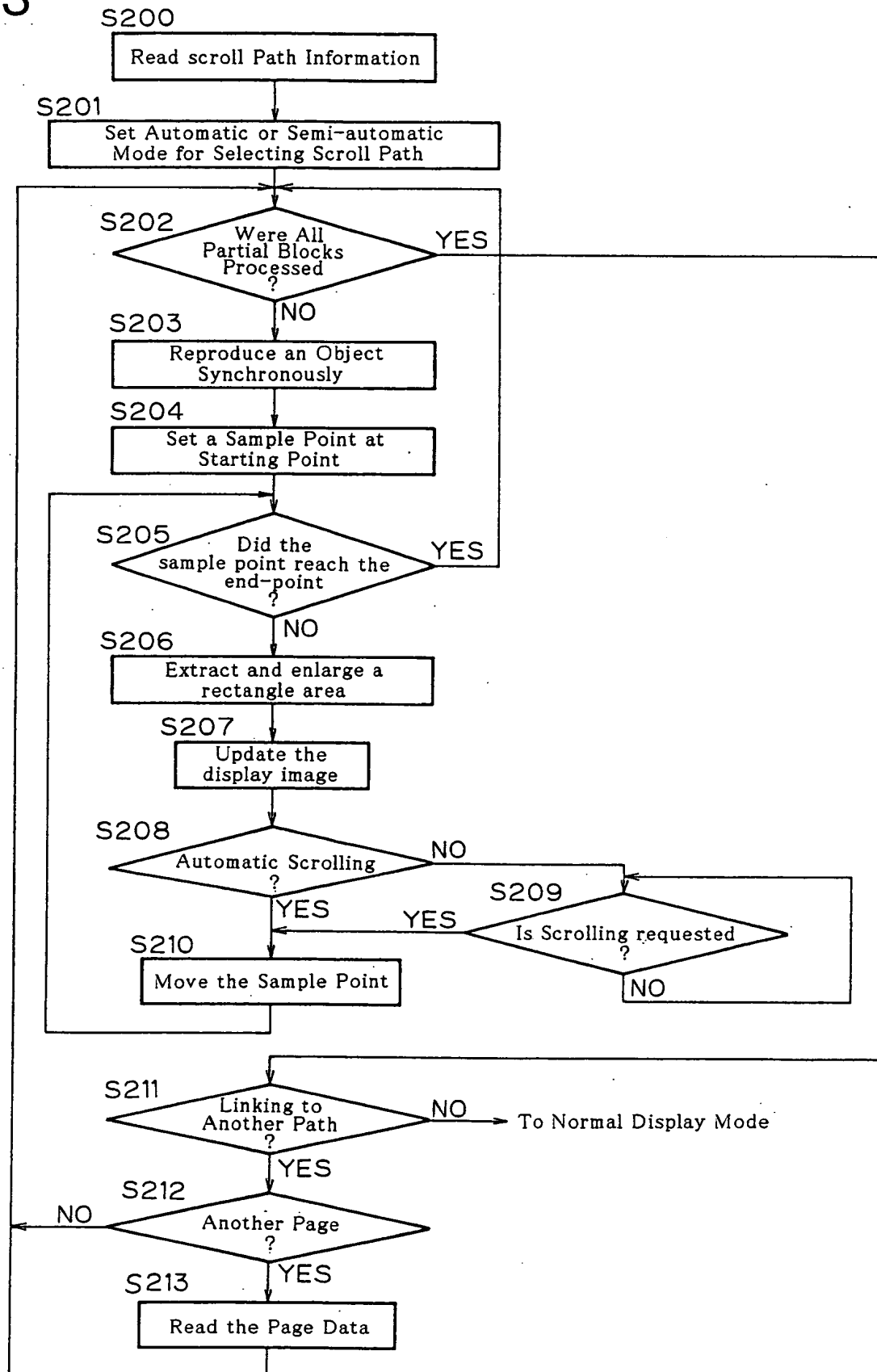
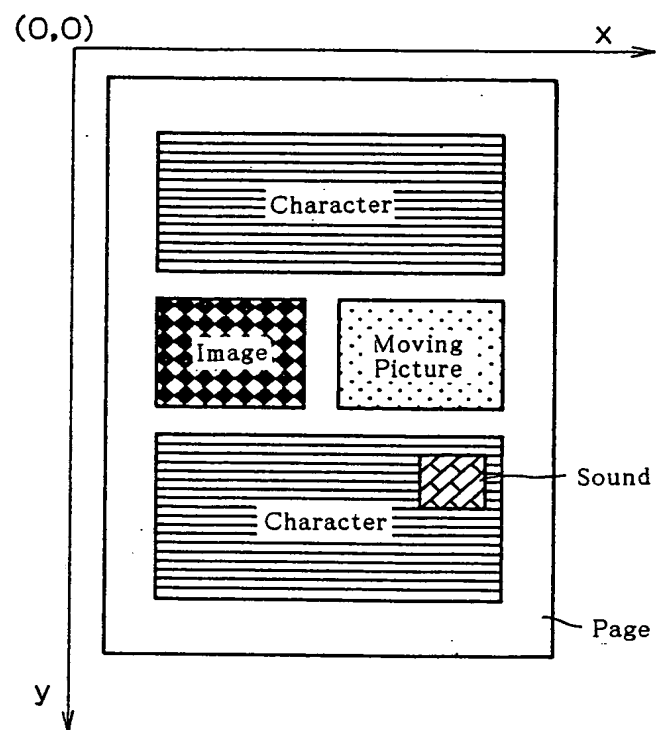
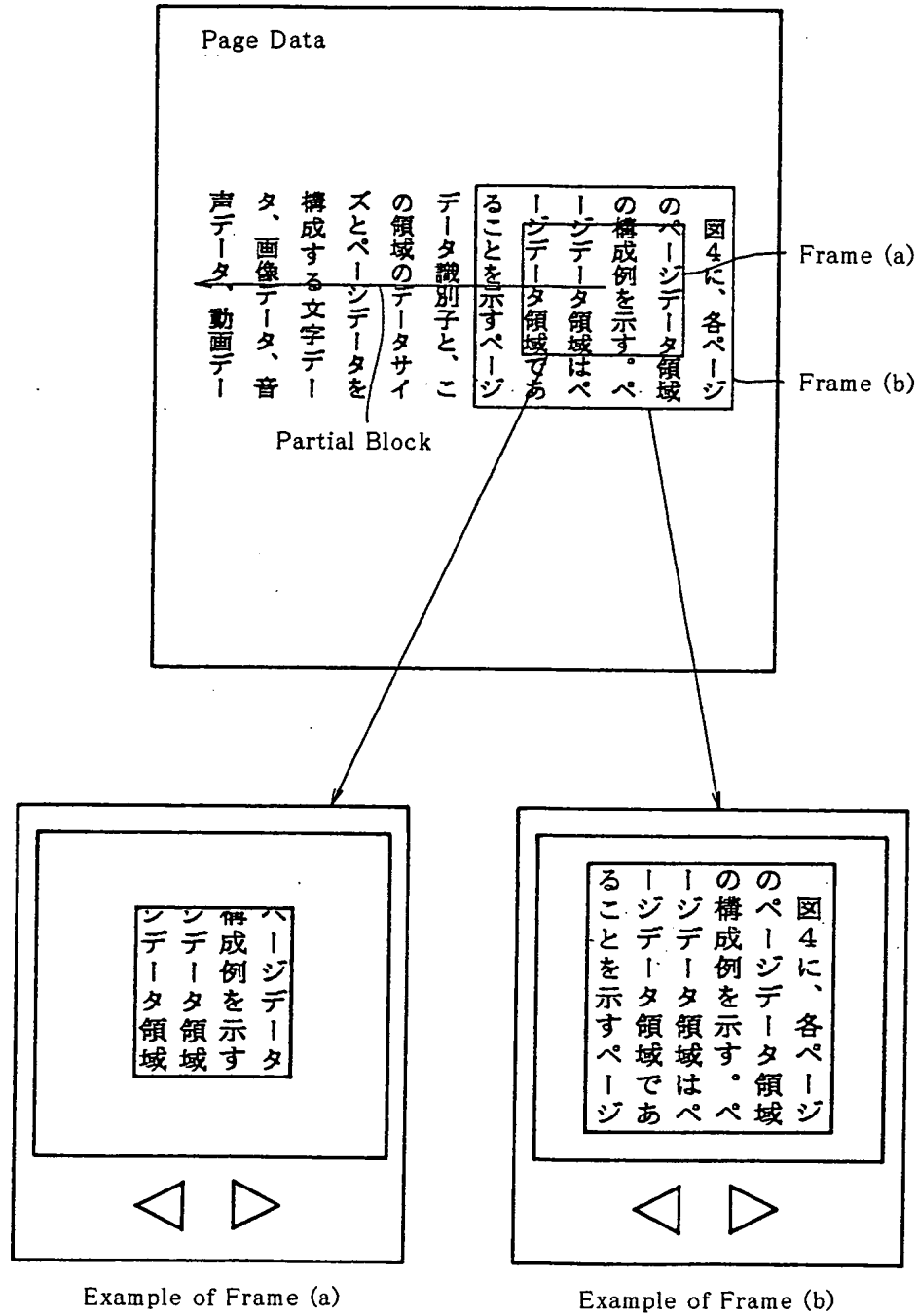


FIG.14





# FIG.15



[Document Name] Abstract

[Abstract]

[Object]

To scroll display data at an electronic book flexibly.

[Solving Means]

Book data is stored in a storage medium as display data on the page-by-page basis. A page data area storing data of the respective pages and a scrolling path information area for scroll display are stored as a file of respective page unit in the storage medium.

[Selected Drawing] Fig. 1